IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application)	PATENT APPLICATION
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Inventors: Zaidi, et al.)	
)	
Application No.: Unknown)	
)	
Filed Date: December 21, 2001)	
)	Customer No.: 28554
Title: CROSS-BAR SWITCH WITH)	
SINK PORT ACCEPTING)	
MULTIPLE PACKETS)	
)	

PRELIMINARY AMENDMENT

Box Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Applicants respectfully request that the Examiner enter the following amendments to the above-identified patent application, which is a continuation of U.S. Patent Application Serial No. 09/900,514, assigned to Group Art Unit 2661.

AMENDMENTS

Please amend the application as follows:

In the Claims:

Please replace claims 1-38 with claims 39-73 as shown below. Applicants add new claims 39-73 and cancel claims 1-38. All pending claims are reproduced below.

39. (new) An apparatus comprising:

a set of input ports to receive data packets;

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a set of sink ports in communication with said set of input ports to receive and forward said data packets, wherein each sink port in said set of sink ports is adapted to concurrently receive a plurality of data packets; and

a set of data rings in communication with said set of input ports and said set of sink ports.

40.   (new) The apparatus of claim 39, wherein each data packet in said plurality of data packets has a same destination address.

41.   (new) The apparatus of claim 39, wherein each sink port in said set of sink ports includes a storage buffer adapted to concurrently store said plurality of data packets.

42.   (new) The apparatus of claim 41, wherein said set of data rings couples each sink port in said set of sink ports to each input port in said set of input ports

43.   (new) The apparatus of claim 39, wherein a first sink port in said set of sink ports is adapted to receive a first data packet in said plurality of data packets and a second data packet in said plurality of data packets, wherein:

a first input port in said set of input ports sources said first data packet, and

a second input port in said set of input ports sources at least a portion of said second data packet during a time when said first input port sources said first data packet.

44.   (new) The apparatus of claim 43, wherein said first sink port is adapted to receive said at least a portion of said second data packet during a time said first sink port receives said first data packet.

45.   (new) The apparatus of claim 44, wherein said set of data rings includes three rings.

46. (new) The apparatus of claim 44, wherein each sink port in said set of sink ports snoops data packets on each data ring in said set of data rings.

47. (new) The apparatus of claim 44, wherein said first sink port snoops data packets on each data ring in said set of data rings to determine whether said data packets are addressed to a destination supported by said first sink port.

48. (new) The apparatus of claim 44, wherein a first set of input ports in said set of input ports is coupled to a first data ring in said set of data rings and a second set of input ports in said set of input ports is coupled to a second data ring in said set of data rings, wherein said first set of input ports includes said first input port and said second set of input ports includes said second input port.

49. (new) The apparatus of claim 44, wherein said first sink port snoops data packets on each data ring in said set of data rings and determines whether to accept said first data packet based on a set of criteria, wherein said set of criteria includes:

said first sink port having sufficient storage space for storing said first data packet,

said first sink port supporting a destination targeted by said first data packet, and

a total number of packets being received by said first sink port not exceeding a predetermined number of packets.

50. (new) The apparatus of claim 44, wherein said first sink port includes:

a ring interface coupled to said set of data rings to receive data from data packets;

a storage buffer coupled to said ring interface to receive and store said data; and

an output port coupled to said storage buffer to receive said data from said storage buffer and transmit said data on a communications link.

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51.   (new) The apparatus of claim 39, wherein said apparatus is a cross-bar switch.

52.   (new) An apparatus comprising:
a set of input ports to receive data packets; and
a set of sink ports in communication with said set of input ports to receive and forward said data packets, wherein:

a first sink port in said set of sink ports is adapted to snoop data packets received by said set of input ports to determine whether said data packets are targeted to a destination supported by said first sink port,

said first sink port is adapted to receive a first data packet and a second data packet, and

said first sink port is adapted to receive a portion of said second data packet at a time when said first sink port receives said first data packet.

53.   (new) The apparatus of claim 52, wherein said first data packet is targeted to a first destination and said second data packet is targeted to said first destination.

54.   (new) The apparatus of claim 52, wherein:
a first input port in said set of input ports sources said first data packet, and
a second input port in said set of input ports sources a portion of said second data packet at a time when said first input port sources said first data packet.

55.   (new) The apparatus of claim 52, further including a set of data rings in communication with said set of input ports and said set of sink ports.

56.   (new) The apparatus of claim 55, wherein said first sink port includes:
a ring interface coupled to said set of data rings to receive data from data packets;

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a storage buffer coupled to said ring interface to receive and store said data, wherein said storage buffer is adapted to concurrently store said first data packet and said second data packet; and

an output port coupled to said storage buffer to receive said data from said storage buffer and transmit said data on a communications link.

57.   (new)   The apparatus of claim 55, wherein said set of data rings couples each sink port in said set of sink ports to each input port in said set of input ports

58.   (new)   The apparatus of claim 55, wherein each sink port in said set of sink ports snoops data packets on each data ring in said set of data rings.

59.   (new)   The apparatus of claim 52, wherein said apparatus is a cross-bar switch.

60.   (new)   A method comprising the steps of:

(a)   receiving a set of data packets;

(b)   transferring said set of data packets to a set of data rings in communication with a set of sink ports;

(c)   a sink port in said set of sink ports, determining whether to accept data packets in said set of data packets, based on a set of criteria; and

(d)   said sink port, collecting data for data packets accepted by said sink port, wherein said step (d) includes the steps of:

(1)   said sink port collecting data for a first data packet, and

(2)   said sink port collecting data for a portion of a second data packet during a time period when said step (d)(1) is being performed.

61.   (new)   The method of claim 60, wherein said first data packet and said second data packet are targeted to a first destination.

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62.   (new) The method of claim 60, wherein said step (a) includes the steps of:

(1)   receiving said first data packet; and

(2)   receiving a portion of said second data packet during a time period when said step (a)(1) is being performed.

63.   (new) The method of claim 62, wherein said step (b) includes the steps of

(1)   transferring said first data packet to a data ring in said set of data rings; and

(2)   transferring a portion of said second data packet to a data ring in said set of data rings during a time period when said step (b)(1) is being performed.

64.   (new) The method of claim 60, wherein said step (c) includes the steps of:

(1)   said sink port, determining whether a data packet includes a destination address supported by said sink port; and

(2)   said sink port, determining whether to accept said data packet based on additional criteria in said set of criteria, wherein said step (c)(2) includes the steps of:

(i)   determining whether said sink port is enabled to receive data packets;

(ii)   determining whether said sink port has sufficient resources to store said data packet;

(iii)   determining whether said sink port is currently receiving a maximum allowable number of packets; and

(iv)   determining whether said data packet has a number of bytes within a predetermined range.

65.   (new) The method of claim 60, further including the step of:

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(e)   said sink port, issuing a rejection signal if said sink port determines not to accept said data packet in said step (c), wherein said rejection signal terminates further reception of said data packet by said sink port.

66.   (new) The method of claim 60, further including the step of:

(f)   said sink port transmitting said data packets collected in said step (d).

67..   (new) A method comprising the steps of:

(a)   receiving a set of data packets on a set of input ports, wherein said step (a) includes the steps of:

      (1)   receiving a first data packet, and

      (2)   receiving a second data packet;

(b)   a sink port in a set of sink ports in communication with said set of input ports, determining whether to accept data packets in said set of data packets, based on a set of criteria; and

(c)   said sink port, collecting data for data packets accepted by said sink port, wherein said step (c) includes the steps of:

      (1)   said sink port collecting data for said first data packet, and

      (2)   said sink port collecting data for a portion of said second data packet during a time period when said step (c)(1) is being performed.

68.   (new) The method of claim 67, wherein said first data packet and said second data packet are targeted to a first destination.

69.   (new) The method of claim 67, wherein a portion of said second data packet is received in said step (a)(2) during a time period when step (a)(1) is being performed.

70.   (new) The method of claim 67, further including the step of:

(d)   transferring said set of data packets from said set of input ports to a set of data rings in communication with said set of input ports and said set of sink ports, wherein said step (d) includes the steps of:

(1) transferring said first data packet to a data ring in said set of data rings; and

(2) transferring a portion of said second data packet to a data ring in said set of data rings during a time period when said step (d)(1) is being performed.

71. (new) The method of claim 67, wherein said step (b) includes the step of:

(1) said sink port, determining whether a data packet includes a destination address supported by said sink port; and

(2) said sink port, determining whether to accept said data packet based on additional criteria in said set of criteria, wherein said step (b)(2) includes the steps of:

(i) determining whether said sink port is enabled to receive data packets;

(ii) determining whether said sink port has sufficient resources to store said data packet;

(iii) determining whether said sink port is currently receiving a maximum allowable number of packets; and

(iv) determining whether said data packet has a number of bytes within a predetermined range.

72. (new) The method of claim 67, further including the step of:

(e) said sink port, issuing a rejection signal if said sink port determines not to accept a data packet in said step (b), wherein said rejection signal terminates further reception of said data packet by said sink port.

73. (new) The method of claim 67, further including the step of:

(f) said sink port transmitting said data packets collected in said step (c).

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In the Specification:

Please replace the title of the above-identified patent application appearing at page 1, line 1 of the application with the title appearing below. A marked up copy of the amended title is shown in Appendix A to this Amendment.

CROSS-BAR SWITCH WITH SINK PORT ACCEPTING MULTIPLE PACKETS

In the Abstract:

Please replace the ABSTRACT of the above-identified patent application appearing at page 43 of the application with the ABSTRACT appearing below. A marked up copy of the amended ABSTRACT is shown in Appendix B to this Amendment.

A cross-bar switch includes a set of input ports to receive data packets and a set of sink ports in communication with the input ports to receive the data packets and forward them onto a communications link. Each sink port is adapted to concurrently receive multiple data packets targeted to the same destination or multiple destinations. For example, one sink port receives a first data packet and a second data packet. The one sink port receives at least a portion of the second data packet during a time period in which the one sink port is receiving the first data packet.

REMARKS

Applicants respectfully submit that claims 39-73 are in order for allowance and request consideration of these claims.

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The Commissioner is authorized to change any underpayment or credit any overpayment to Deposit Account No. 501826 for any matter in connection with this document.

Respectfully submitted,

Date: _December 21, 2001_   By: _William J. Harmon, III_
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APPENDIX A

The title of the patent application appearing at page 1, line 1 of the application has been amended as follows:

CROSS-BAR SWITCH <u>WITH SINK PORT ACCEPTING MULTIPLE PACKETS</u>

APPENDIX B

The ABSTRACT of the patent application appearing at page 43 of the application has been amended as follows:

[A cross-bar switch includes a set of input ports for receiving data packets and a set of sink ports for transmitting the received packets to identified targets. A set of data rings couples the input ports to the sink ports. Each sink port utilizes the set of data rings to simultaneously accept multiple data packets targeted to the same destination — creating a non-blocking cross-bar switch. Sink ports are also each capable of supporting multiple targets — providing the cross-bar switch with implicit multicast capability.]

A cross-bar switch includes a set of input ports to receive data packets and a set of sink ports in communication with the input ports to receive the data packets and forward them onto a communications link. Each sink port is adapted to concurrently receive multiple data packets targeted to the same destination or multiple destinations. For example, one sink port receives a first data packet and a second data packet. The one sink port receives at least a portion of the second data packet during a time period in which the one sink port is receiving the first data packet.